Injury Extra (2007) **38**, 90—93

ELSEVIER

www.elsevier.com/locate/inext

CASE REPORT

# Flexor carpi radialis rupture reined in!

**A.J. Cowey, M.R. Carmont*, B. Tins, D.J. Ford**

*The Hand and Upper Limb Unit, The Department of Radiology, The Robert Jones and Agnes Hunt Orthopaedic and District Hospital, Oswestry, Shropshire SY10 7AG, United Kingdom*

Accepted 1 August 2006

## Introduction

The spontaneous rupture of flexor carpi radialis (FCR) is a rare event. We found only 15 cases reported in the literature.[1,2,5,7,9,12—17] Isolated cases of FCR rupture are commonly associated with Scapho-Trapezium-Trapezoid (STT) osteoarthritis.

We present a case of FCR rupture including clinical photographs and illustrate the ultrasound appearance of this tendon rupture.

## Case report

A 57-year-old patient complained of 1 year of worsening right wrist pain. The pain varied in severity but was worse with strenuous activities. There had been a fluctuant swelling on the volar surface of the wrist towards the radial side however this settled. The patient was fit and well with no previous surgery or injection to the wrist or carpal tunnel and took no regular medication. Most of the patient's time was spent riding and working with horses.

Examination revealed swelling and thickening around the STT joint with worse pain and crepitus on loading but no tenderness. Radiographs (Fig. 1) reveal early OA changes. The patient was provided with a wrist splint, recommended anti-inflammatory medication and activity modification until her symptoms settled. Serological investigations for inflammation were normal.

After 10 months the patient represented, explaining that although her symptoms had initially settled, they had deteriorated recently and 4 weeks ago something give way within her wrist. Following this, her wrist had been painful but had since settled and she had been able to return to her normal strenuous activities with her horses without a problem.

At re-examination there was a visible defect in the tendon of flexor carpi radialis (Fig. 2), the wrist was not tender and demonstrated normal range of motion. The grip strength was 34.8 lbs on the right compared to 40.6 lbs on the non-affected side, measured using an Elink Dynamometer (Biometrics Ltd., Cwmfelinfach, Gwent, UK). Ultrasound (Sonoline Elegra, Seimens, Erlangen, Germany) confirmed a rupture of the flexor carpi radialis tendon (Figs. 3—5). The muscle belly was retracted proximally. Distally the tendon stump was degenerate and there was non-specific thickening of the empty tendon sheath but no inflammatory change seen. The other volar tendons were normal.

Since the giving way sensation the patient reported no interference with her activities of daily living and horse riding and therefore she was managed non-operatively. When reviewed 6 weeks later there were no further problems.

* Corresponding author. Tel.: +44 1691404000.
*E-mail address:* mcarmont@hotmail.com (M.R. Carmont).

1572-3461 
doi:10.1016/j.injury.2006.08.060

**Figure 1** AP radiograph of wrist revealing early STT osteoarthritis.

## Discussion

FCR originates from the common flexor mass of the medial epicondyle and passes distally into the forearm. It gives rise to a tendonous portion approximately 8 cm from the tip of the radial styloid. The tendon passes through the antebrachial fascia and through the carpal tunnel within its own fibrous sheath on the scaphoid side of the tunnel, deep to the trapezium beneath the STT and Carpo Metacarpal (CMC) joints. The tendon then inserts onto the base of the index metacarpal.[4] Ninety percent of the space within the sheath is occupied by the tendon.[5,10]

Tendon rupture can be associated with systemic inflammatory diseases.[12] Localised tendonopathy secondary to osteoarthritis,[14] attrition from bone

**Figure 2** Clinical photograph demonstrating the defect in the tendon of FCR lateral to the intact Palmaris Longus.

spurs,[17] or damage from steroid injection either into the tendon sheath or STT or CMC joints.[3,5] STT osteoarthritis has been reviewed by Carstem. In this case the arthritis was mild.[6] Tendon rupture may

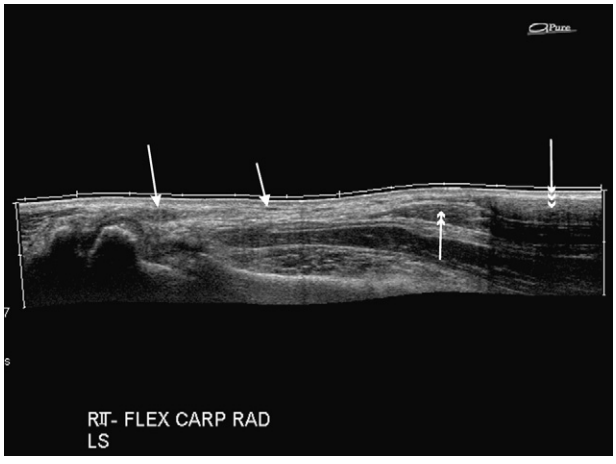


**Figure 3** Ultrasound static image of the longitudinal section of the right forearm. The arrow pointer demonstrating the fascial sheath, the triangle pointer the FCR tendon, the double pointer the striated muscle bulk of Flexor Digitorum Superficialis as compared to the muscle bulk of FCR, triple pointer, which is not under tension and has lost its striated appearance.

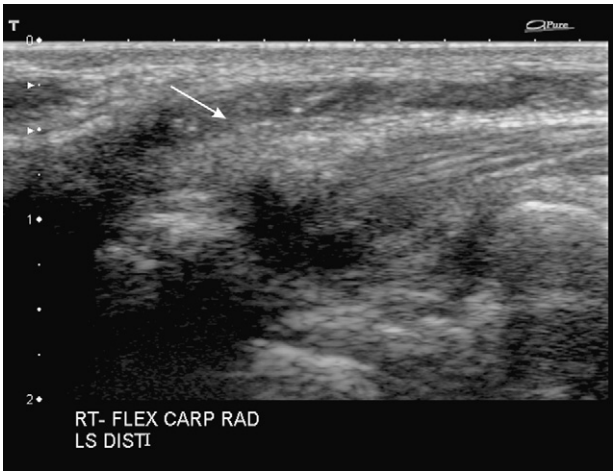


**Figure 4** Close up longitudinal ultrasound section of the FCR fascial sheath showing the tendon rupture.

also occur following steroid injections.[11] Patients should be specifically asked about any hand or wrist injections as injection sites may, in the patient's opinion, be well away from the site of the problem, e.g. the STT and CMC joints.

In the majority of reported ruptures, the patient complains of pre-existing volar wrist, pain and swelling, followed by an acute snapping sensation with persisting wrist tenderness. Examination may reveal a visible tendon defect, tenderness upon palpation and surgical exploration reveal fibrous neotendon or a gap visualised by radiological imaging.[8,9] Polatsch et al. and Parellada et al. (personal communication) has recently demonstrated tendon rupture on Magnetic Resonance Imaging (MRI).[14,15]

The ruptured tendon may be easily visualised with inspection however in larger forearms normal anatomy may not be so clearly defined. In such situations ultrasound may be considered to be the primary investigation of choice. The benefits of ultrasound investigation to the upper limb have recently been described with the relative low cost, readiness and non-invasive nature compared to MRI.[3]

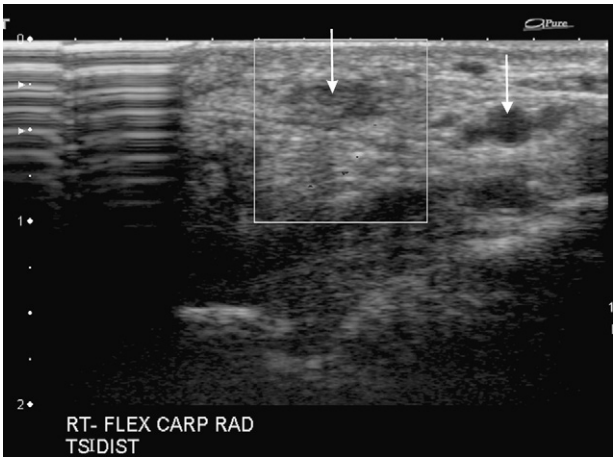


**Figure 5** Transverse ultrasound section of the distal forearm. The arrow pointer demonstrating the empty fascia left by the retracted tendon. The triangle pointer indicating the radial artery.

We have demonstrated FCR rupture using ultrasound. The tendon defect is shown as a hypoechoic black area within the tendon sheath contrasting with the hyperechoic white area of the retracted tendon (Figs. 3—5). The ruptured tendon loses its continuity and the muscle retracts compared to the others within the forearm. This loss of tension is seen as a loss of striated appearance of the normally tensioned muscle on ultrasound (Fig. 3).

For some cases of tendinopathy, surgical exploration may be performed facilitating surgical repair, decompression and synovectomy.[8] Non-operative management has been suggested for low demand patients.[1] Our patient had some objective reduced wrist strength, but had been able to undertake high demand activities such as riding and equine management without a problem.

Ultrasound may be considered as a primary radiological imaging modality for cases of suspected FCR rupture. Tendon ruptures, depending upon the tendons involved, may be managed non-operatively even in high demand patients.

## Acknowledgements

We would like to thank the Departments of Radiology and the Department of Medical Illustration at the Robert Jones and Agnes Hunt Hospital for their help and expertise with this case report.

## References

1. Allred DW, Rayan GM. Flexor carpi radialis tendon rupture following chronic writ osteoarthritis: a case report. J Okla State Med Assoc 2003;96(5):211—2.
2. Anzels S, Carey K, Weiner A, Lipscomb PR. Disruptions of muscles and tendons: an analysis of 1014 cases. Surgery 1959;45:406—14.
3. Bianchi S, Martinoli C, Abdelwahab IF. Ultrasound of tendon tears. Part 1: general considerations and the upper extremity. Skeletal Radiol 2005;34(9):500—12.
4. Bishop AT, Gabel G, Carmichael SW. Flexor carpi radialis tendinitis. Part I: operative anatomy. J Bone Joint Surg 1994;76-A(7):1009—14.
5. Bowe A, Doyle L, Millender LH. Bilateral partial ruptures of the flexor carpi radialis tendon secondary to trapezial arthritis. J Hand Surg 1984;9A(5):738—9.
6. Carstem N, Eiken O, Andren L. Osteoarthritis of the scaphotrapezoid joint. Acta Orthop Scand 1968;39:354—8.

7. Fitton JM, Shea FW, Goldie W. Lesions of flexor carpi radialis tendon and sheath causing pain at the wrist. J Bone Joint Surg 1968;50B:359—63.
8. Gabel G, Bishop AT, Wood MB. Flexor carpi radialis tendinitis. Part II: results of operative treatment. J Bone Joint Surg 1994;76-A(7):1015—8.
9. Irwin LR, Outhwaite J, Burge PD. Rupture of the flexor carpi radialis tendon associated with scapho-trapezial osteoarthritis. J Hand Surg 1992;17B:343—5.
10. Johnson D, Ellis H. Pectoral girdle and upper limb. In: Standing S. Gray's Anatomy39th ed., Edinburgh: Elsevier; 2005. p. 875—6.
11. Karpman RR, McComb JE, Volz RG. Tendon rupture following local steroid injection: report of four cases. Postgrad Med 1980;68(1):169—74.
12. Mannerfeld L, Norman O. Attrition ruptures of flexor tendons in rheumatoid arthritis caused by bone spurs within the carpal tunnel. J Bone Joint Surg 1969;51A:270—7.
13. Moore JR, Weiland AJ, Valdata L. Tendon ruptures in the rheumatoid hand: analysis of treatment and functional results in 60 patients. J Hand Surg 1987;12A(1): 9—14.
14. Parellada AJ, Morrison WB, Reiter SB, Canno JA, Kloss LA, Eilickman PL, et al. FCR tendinopathy: spectrum of imaging findings and association with triscaphe arthritis. Skeletal Radiol 2006;35(8):572—8.
15. Polatsch DB, Foster LG, Posner MA. An unusual rupture of the flexor carpi radialis tendon: a case report. Am J Orthop 2006;35(3):141—3.
16. Tonkin MA, Stern HS. Spontaneous rupture of the flexor carpi radialis tendon. J Hand Surg 1991;16B(1):72—4.
17. Verkellen K, Dauwe D, Demuynck M, Kestelijn P, Vanden Berghe L. Spontaneous ruptures of the flexor carpi radialis tendon secondary to STT osteoarthritis. Acta Orthop Belg 1992;58(4):474—6.